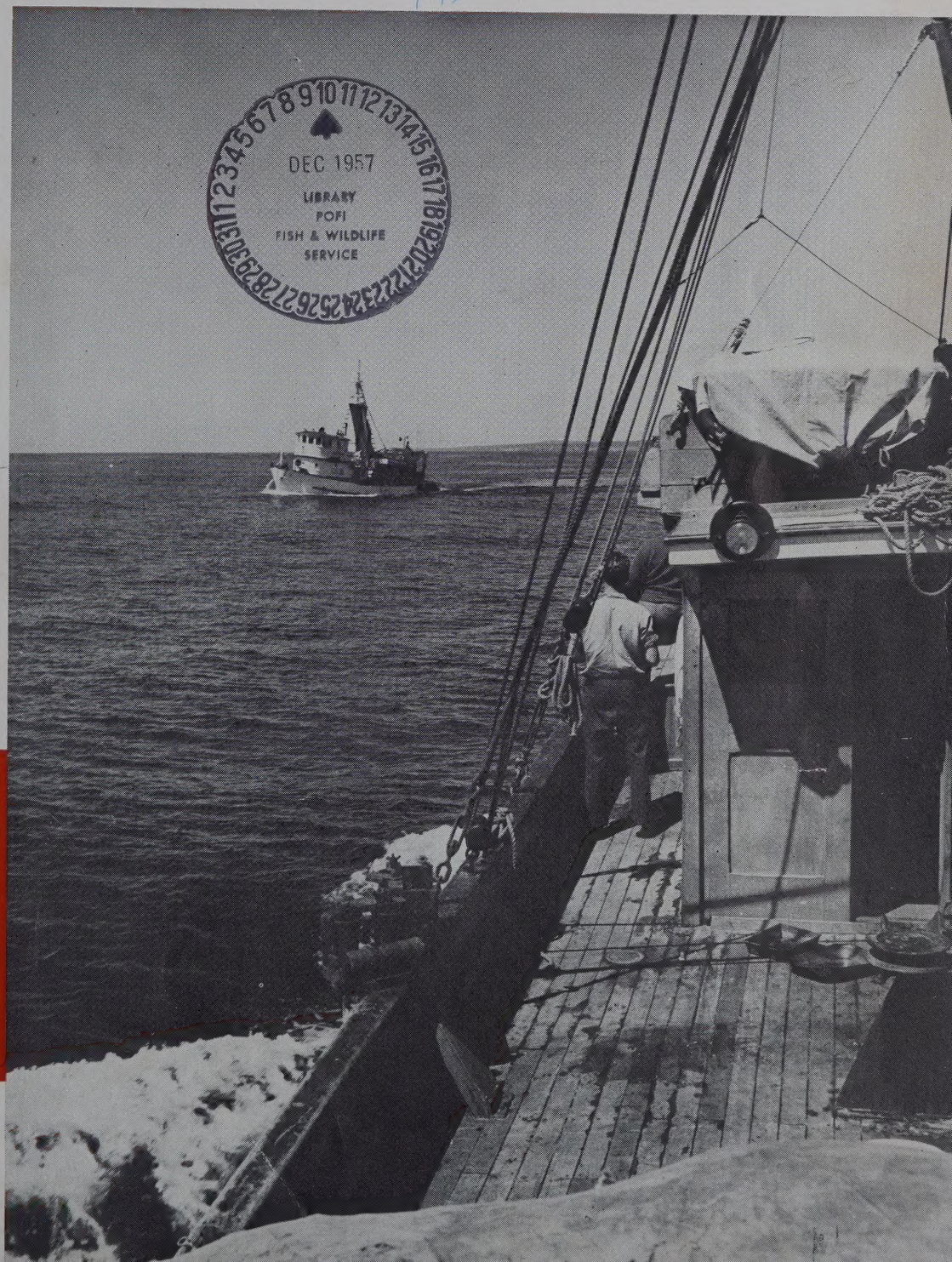
PAN AMERICAN fisherman

ESTABLISHED 1947

In This Issue . . .

- ★ Ups and Downs of the Sea
- ★ POFI Scientific Activities
- ★ Modern Fishing Methods

P. 13



November
1957

SIGNS OF CHRISTMAS...

as pretty as...

distinctive as...

familiar as...

and seen in

even more homes than...

ARE THE AMERICAN PEOPLE'S

FAVORITE SYMBOLS OF CHRISTMAS GIVING

Christmas Seals make possible a year-round gift to every man, woman and child—help and protection against tuberculosis. From now 'til Christmas make every card, letter, and package a double gift—with Christmas Seals.

BUY AND USE CHRISTMAS SEALS

Insuring the Present . . . and the Future

As in the Past . . . So in the Future

All Activities of the American Tunaboat Association

Are Directed to the Improvement and Prosperity

of the Tuna Industry

Joseph J. Madruga
President

Harold F. Cary
General Manager

AMERICAN TUNABOAT ASSOCIATION

No. 1 TUNA LANE • SAN DIEGO, CALIFORNIA

"I have had lots of troubles"

After years of work, the doorway to literary success finally opened. She managed to get her novel, *Moods*, published.

It promptly flopped.

Undaunted, she wrote a second novel, which instantly turned out to be the rage of 1869. Businessmen, lawyers, housewives, everybody read and talked about *Little Women*.

Fortune had finally smiled on Louisa May Alcott. Twenty years had passed between her first writings and *Little Women*—years of privation, struggle, pain. She had worked as a maid, as a paid companion, had nearly lost her life as a Civil War nurse, had once come close to suicide.

Now world-famous, her family secure, she would write many more books. And people would love them. For, as she said, "I have had lots of troubles; so I write jolly tales."

In those words, spoke the kind of unvarnished courage without which this country would be a far poorer place. Poorer not only by Louisa May Alcott's stories, but by the accomplishments of millions. For it is human courage and character that have made America wealthy and strong. And have made America's Savings Bonds one of the world's finest investments.

170 million Americans back U.S. Savings Bonds—back them with a guarantee unmatched by any other form of saving. Your principal guaranteed safe to any amount—your interest guaranteed sure—by the greatest nation on earth. If you want *real* security, buy Bonds. Get them at your bank or through the Payroll Savings Plan where you work. And hold on to them.

SAFE AS AMERICA . . . U. S. SAVINGS BONDS

The U. S. Government does not pay for this advertisement. It is donated by this publication in cooperation with the Advertising Council and the Magazine Publishers of America.

Published Monthly • *Established 1947*

PAN AMERICAN fisherman

SANDO PUBLICATIONS
KEllogg 8-5441
Orange Savings Building
ORANGE, CALIFORNIA

VOL. 12 - No. 4
NOVEMBER
1957

BRIANT SANDO—Editor and Publisher
ROBERT K. LAWSON
Associate Editor
STAFF PHOTOGRAPHERS
Busco-Nestor Studios

ADVERTISING REPRESENTATIVES

A. S. Babcock Co.
605 Market St.
SAN FRANCISCO 5, CALIF.
Telephone Yukon 2-3954

Howard F. McClenahan
402 - 1010 Euclid Bldg.
CLEVELAND 15, OHIO
Telephone Prospect 1-6100

W. R. Ewald
P.O. Box 228
FRANKLIN, MICH.
Telephone Mayfair 6-1138

In This Issue...

The Behavior of Fish 5
Ups and Downs at Sea 6
Salt Water Ice Tested on Fish 7
Modern Fishing Methods 8
Pacific Oceanic Fisheries Investigations 10
What's New or Different 11
Uncle Sam's "Answer Book" 12
Tuna Costs Favor Consumers 12
Sun Over Costa Rica—Book Review 13

Pan American Fisherman is published monthly • Business office—Orange Savings Building, Orange, California, telephone KEllogg 8-5441. Subscription rates in the United States and possessoins, one year $3.00: two years $5.00; five years $10.00. Canada $4.00 per year; all other countries $5.00 per year. Current copies 50c each; back numbers $1.00 each when available. Entered as second class matter March 12, 1953, at the Post Office at Orange, California, under the Act of March 3, 1879. Postmaster: Form 3579 requested.

FRUSTRATED FISH

THE BEHAVIOR OF FISH

Fish, like humans, become "frustrated" when placed under conditions of stress and strain.

This was observed while biologists of the U.S. Fish and Wildlife Service conducted basic research on sockeye salmon at the fish behavior laboratory of the Pacific Salmon Investigations in Seattle.

Scientists also observed a "King-of-the-Mountain" routine among the salmon in which one became dominant and conquered the others for the choice shelter in a pool.

These sidelights on the salmon's nature came about this way: Biologists set up a six foot, three-chambered tank (with connecting chambers at top) with fresh water, brackish water, and salt water. Three fish were introduced into the fresh water to see if sockeye salmon smolts were ready for their journey to salt water.

The fish paid no attention to the difference in salinity of the waters, but soon took up residence, one fish to a pool. When two other fish were introduced, the established fish fought violently to guard their homes even to the extent of pulling out scales of the newcomers when they came into their two-foot chambers. The fourth and fifth fish had no place to go and exhibited signs of frustration —flicking of fins, quivering and shaking.

But when the five fish, who had been fighting furiously a few minutes previously, were placed together in a large unpartitioned pool, they quickly schooled and acted "like long lost friends."

Sockeyes normally exhibit the highest schooling behavior of any salmon.

Then a block of wood about one foot square was placed on the water providing a shaded area in the center of the pool. All the fish took for this shelter but shortly one strong salmon was "king" and drove all the other fish away much in the manner of the peck order with one hen established in barnyard flocks of fowl.

The fish driven from the shade of the wood took to the unsheltered corners of the pool and shook all over, according to the biologists. They appeared to be highly excited and agitated. They were paler in color than a normal fish. These characteristics continued as long as there was this condition of stress or replacement.

The fish behavior laboratory, housed in a wooden structure adjoining the main building of the Pacific Salmon Investigations on Montlake Boulevard in Seattle, has conducted a series of studies over six months. The purpose of the research is to gain a basic understanding of fish behavior. This information will be useful in field studies which in turn are applied to the conservation and wise management of the salmon resource.

Help Fight TB

Buy Christmas Seals

SEACORD'S

Pump & Injector

SERVICE

"All Makes"

SALES

AMERICAN BOSCH
BENDIX SCINTILLA
ADECO FUEL PRODUCTS
TROJAN BATTERIES

BElmont 4-1454

1337 India Street

San Diego 1 California

GET SET for the new ship-to-shore telephone channels

Now you can get new speed and convenience in ship-to-shore service. There's a second full-time channel for San Francisco . . . additional daytime channels for Seattle and San Pedro. Even if you already use ship-to-shore, you may want to get on one of the new, less congested channels. And if you're buying new radiotelephone equipment, be sure to include *all* the channels you need.

Call us any time for up-to-date facts on radiotelephone ship-to-shore service along the Pacific Coast.

Pacific Telephone

UPS and DOWNS AT SEA

By Hilary B. Moore

WE ARE SO USED to the daily rhythm of day and night, of light and dark, that we are apt to take it for granted. We forget how much our habits are moulded by it. But if we think back to the days of primitive mankind we will find that our ancestors were active during the day but retreated to a sheltered place to sleep during the hours of darkness.

Modern man does not always follow this precept of "early to bed and early to rise . . .", mainly because he has been able, artifically, to turn the night into day as far as he is concerned. But the rest of the animal kingdom has no such ability. Animals must take things as they find them and so they usually obey a simple routine which follows the changes in the light from the sun. Some are active in the daytime and sleep at night when it is dark and colder. Others sleep all day and emerge only at dusk to pursue the business of feeding. But both have a rhythm in their movements.

It is characteristic of animals that they can move about—most of them have to, in order to find their food. Movement is just as important to them, though, as a means of seeking the conditions that best suit their living needs and of avoiding those that are harmful. We see an extreme example in the spring and fall migrations of birds. On a smaller scale, great numbers of other animals are regularly on the move under the urge of changing climate. The migrations do not have to be extensive. The distance from under a dead leaf out into the open may make all the difference to an insect in need of protection from the hot sun.

Marine Migrations

The sea, too, has its spectacular migrations. Whales feed in the plankton-rich waters off Mexico in the antarctic summer, but they trek up to the Pacific coast for the winter. Some of the oceanic birds travel even further.

On the smaller scale, in the barely visible creatures of the sea, we find migrations which are just as spectacular. A copepod in the plankton, less than a quarter of an inch long is, for his size, making a tremendous journey when he swims up a hundred fathoms to the surface every night. In terms of his own length this is as if he swam over thirty miles. What is more, the copepod makes this trip in a few hours only and swims down again the same distance next morning.

The land animals which avoid sunlight too bright for them may find suitable shade close by. They may not have far to go to find a shelter under a stone, or down a burrow. There is no such shade in the open sea and the only way to get away from the light is to swim down to a depth great enough for the harmful rays to have been absorbed. In clear waters this may be a long way down.

It is one of the most striking phenomena in the ocean's populations, that the upper layers are almost deserted in the daytime. True, there are a few animals which seem to like the bright light, but the great majority cannot stand it. In fact, many of them die if they cannot get away to more somber regions.

At first sight it would seem that such creatures have an easy solution to the problem. Why can they not live permanently at a depth of a few hundred fathoms, where the light will never get too strong for them? It is true that some of them do, like shade-dwellers of land. But, unfortunately, this would take most of them away from their food supply.

The microscopic plankton plants, which are the basic foodstuff of the

oceans, need light in order to grow. It is up nearer the surface that this vegetation flourishes, and, naturally this is where the small grazing creatures congregate in order to feed. And, of course, if the grazers or herbivores move up into the feeding grounds, the carnivores which prey upon them will follow.

Commuters at Sea

So, we find an endless pendulum swinging in these upper waters, the plant eaters hurrying towards the surface as the evening light allows them and the predators following along; and then, after a busy night of feeding, the whole pack retreats to the dimmer depths as the rising sun begins to illuminate the sea.

The herbivores are mostly pretty small, but the carnivores range right up to the big oceanic fishes, so there is a whole animal world on the move. So spectacular is this migration that we can pick it up on our echo sounding machines—designed for finding the depth to the bottom—and record it as a steadily shifting band on the paper—an echo from all the mixture of animals that is down below the ship.

This is called the scattering layer, since it scatters sound impulses. Before it was well understood, such echoes even gave rise to reports of shoal water where none was supposed to exist, and more than one survey ship has been sent to investigate what was no more than a concentration of plankton and fishes.

Built-in Instruments

On a research vessel we have elaborate instruments to measure the light, the temperature and the pressure in the depths of the sea. A copepod, an eighth of an inch long, must carry a built-in mechanism to give it the same information. What is more, it must be able to weigh one changing condition against another and settle for a compromise that will suit its individual needs. If it goes too deep in trying to avoid the light, it may find the water too cold or the pressure too great. One way and another, we are beginning to understand a little of how the plankton senses the conditions around it and responds as these three conditions change.

At the Marine Laboratory in Miami these creatures are being kept alive in the laboratory in order to find how they react to light, dark, pressure and temperature. At sea we send nets to the different depths at different times of day and night to find where the various types of creatures are and what their rhythm of movement is.

Gradually a pattern is beginning to unfold as the results are analyzed. Often by tedious mathematical analysis. It is a long and complex story and we are only beginning to open it up, but we hope that what we learn from these simpler animals may help later in the understanding of higher forms, up to man himself. *

Salt-Water Ice Tested on Fish

One method that has been proposed for protecting the quality of fish stored in ice is to use a salt-water ice. The basis for this assumption is that, since salt-water ice melts at a lower temperature than fresh water ice, the former may offer advantages in increased storage life of fish. An experiment was, therefore, conducted to compare, under parallel conditions, salt-water ice with fresh-water ice.

Equal quantities of salt-water and fresh-water ice were used to ice representative lots of eviscerated haddock aboard the U.S. Fish and Wildlife Service Vessel *Delaware*. The cooling rates, storage temperatures and keeping quality of the fish were determined.

The fish stored in salt-water ice and in fresh-water ice were of excellent to good quality until the ninth day of iced storage, and of acceptable quality from the ninth until the thirteenth day of iced storage. The fish stored in salt-water ice were cooled faster and to a lower temperature than were the fish stored in fresh-water ice. However, the salt-water ice melted faster than the fresh-water ice and left the fish with less protecting ice. Therefore, the fish in salt-water ice eventually rose to a higher temperature than those stored in fresh-water ice. These results show that in order to maintain fish in salt-water ice at a temperature close to the melting point of this ice, sufficient quantities of ice must be used to compensate for the faster melting.

Australia to Hold Training Center

The advanced organization of Fishermen's Cooperatives in Australia and that country's long experience in fisheries administration has led the Food and Agricultural Organization of the UN to ask Australia to be host to an International Training Center.

Participants (about 35) will be nominated by the member Governments (including the United States) of the Indo-Pacific Fisheries Council. The training center will be held in Sydney and Adelaide from December 16, 1957, to January 25, 1958.

The Center is designed for fisheries cooperative leaders and for Government officials concerned with cooperative organization in fisheries. It will be conducted by the Australian Fisheries Division, Department of Primary Industry, with the Assistant Director of Fisheries as Director.

Reindeer in Bering Sea Islands

With the assignment of two wildlife biologists to St. Matthew Island in Bering Sea, the Fish and Wildlife Service has begun its recently acquired responsibility of managing the reindeer herds in certain specified Alaska areas, states an announcement by the Department of the Interior.

It is pointed out that since the passage of the Reindeer Act of 1937, substantial benefits in building up "domesticated" herds has been accomplished, but in places, particularly on St. Matthew, Umnak and Atka Islands, the reindeer have increased until critical over-population conditions exist.

The St. Matthew reindeer herd was started in 1944 when the Coast Guard brought in 29 of the animals to assure an emergency food supply during the war period. Because there are virtually no natives on the island to harvest the herd and because there are relatively few predators, the herd has increased rapidly until it has exceeded the sustained carrying capacity of the range and will eventually destroy the range and itself too.

St. Matthew Island is more than 200 miles from the nearest Alaska coast. It is 22 miles long and about two miles wide. Atka and Unmak are in the Aleutian chain.

Modern Fishing Methods

THE RAPID growth of the marine sciences, and the development of a number of new stations for marine research, have awakened more interest in this comparatively new frontier of investigation.

Part of these efforts is directed to the exercise of scientific curiosity and imagination upon the unknown, purely for the pursuit of knowledge.

This is a necessary preliminary to the task of putting science to work in ways more directly beneficial to mankind.

The sea's useful application lag behind in many ways when compared to the enormous progress which has taken place in man's activities on the land and in the air.

Bounty of the Sea

Just what are these applications of marine science which not only justify but urgently need the development of basic research? The field is broad, since it covers all possible activities of man related to the seas, their shallow margins, the waters below the surface, the floors of the oceans and even the atmosphere above them.

It covers the whole great range of potential usefulness of the seas. Food, minerals and energy, the problems of navigation, the origin of storms and hurricanes and the transfer of heat from equatorial regions to warm the cold shores of lands nearer the poles, are all aspects of useful scientific interests.

Some are more vital than others today, but the rapid growth in numbers of the human race and the increasing demands made upon natural resources makes it impossible to tell which of them may suddenly become critical. One of the scientific activities of growing importance already is that of fisheries research.

Seafood, in some countries, is a necessary part of food production. In others, such as the United States, a falling off of fish production could partly be offset by agricultural activity. But it requires something like ten tons of vegetable matter to make one ton of beef on the hoof, so that the price of a greatly increased population may be enforced vegetarian existence—unless we are able to use the largely unexploited food production of the sea.

Need for Development

Whether a vital need or a luxury, the fisheries of the world must adopt modern methods and improve their efficiency in order to develop. The first step lies in exploration, the search for new grounds or extension of old ones. Since the distribution of fishes and their migrations are affected by the temperature and saltness of the water, by water currents and by the abundance of microscopic life in the water and by its chemical nature, or by the seafloor and the life upon it, the results of investigations in biological and physical oceanography should be of prime value in guiding exploration.

In exploration for new fisheries even more than in the routine fishery operation itself, the use of fish finding devices is no longer the exception but the rule. Here we have the application of the understanding of sound transmission and reflection in sea water. In some cases it may be possible to find fish by first finding the plankton or microscopic sea life.

After the fish are caught a host of new problems arises. The fish must be kept fresh and be delivered to port in the best possible condition. The development of deep freezing, of special brine tanks and of antibiotic ice have contributed to this.

Once landed, the fish must still be kept in fresh condition. Even though protected from bacterial decomposition, they lose flavor and become stale.

The modern fisheries laboratory is engaged in all these phases of applied science plus the added study of the development of new products, such as fishsticks, breaded shrimp, new canning packs, and even in the problems of economics and marketing. Such laboratories will be found at universities and government organizations such as those of the U.S. Fish and Wildlife Service. Many individual states have their own organizations, of which California has the most extensive.

Modern Instruments

The station for seafishery investigations is likely today to include in its list of personnel not only fishery biologists but electronics and acoustics designers and engineers whose work may include the development of underwater television for the observation of experimental nets in action, or of special instruments for attachment to midwater nets which continuously transmit back to the experimental fishing vessel the depth at which the net is working and the temperature of the water through which the net is passing.

They may record the actual sounds made by fishes, both within and beyond the audible range, and subject them to acoustical analysis. Or investigations may be made of the potential use of electrified nets for attracting shrimps from obstructed seafloors to within the catching range of the net riding above the risk of damage by these obstructions.

Engineering Problems

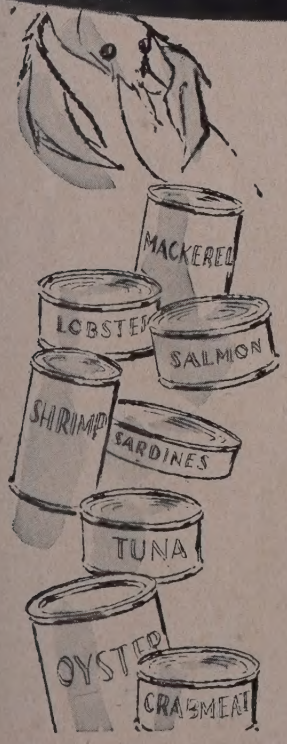
The design of improved nets, hauling gear or winches calls for the services of fishery engineers. Even the fishing vessel comes in for its share of attention.

Most fishing vessel designs have grown from a smaller model and some of the larger vessels today are not always perfectly adapted to their changed condition of operation nor are they always the most seaworthy for their job. The United Nations F.A.O. recognizes the importance of fishing boat design and held a worldwide conference on it. Problems considered included design of winches, main engines, cables and the ship itself. Plans for factory ships were engineered to provide for the entire processing of fish from catching to packaging as frozen fillets. Such questions are so important that, in the United States, the Ocean Resources Institute has been formed for the express study of engineering problems.

Also important is the practical management of the fisheries, or conservation in its broader sense. Here a study of the fish populations, their natural growth and decline, breeding potentials and the effects of fishing upon them is a necessary preliminary to encouraging wise exploitation and setting up wise restrictions, often by international agreement. Even this cannot be divorced from engineering problems since the design of nets may be an important factor in preventing wasteful fishing. ★

From catch to can *Faster*

with Continental's complete fish can service



Continental service begins with precision-made cans in every size and shape for whatever fish you pack. Continental's nine can-making plants cover the West Coast, assuring you fast delivery of fish containers, when and where you need them. To give you trouble-free, faster packing operations, Continental service also includes individual research and engineering assistance from our West Coast laboratories and machinery service centers. West Coast research facilities work closely with Continental's new $7,000,000 Research and Development Center in Chicago, where the most modern equipment is being used to develop new and better ways to pack fish. For *complete* fish can service, call Continental today.

PLANTS AT: Seattle, Walla Walla, Portland, Sacramento, Oakland, Stockton, San Jose, Los Angeles, Terminal Island.

LABORATORIES AT: Portland, Hayward, Whittier.

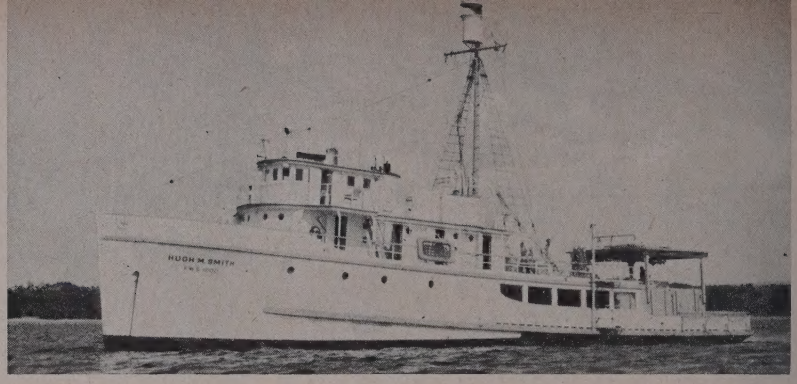
MACHINERY SERVICE AT: Hayward, Whittier.

QUALITY Continental SERVICE

CONTINENTAL CAN COMPANY

Russ Building, San Francisco 4 • 1120 Wilshire Boulevard, Los Angeles 17
Yeon Building, Portland 4 • 601 Myrtle Street, Seattle 8

SCIENTIFIC ACTIVITIES . . .



PACIFIC OCEANIC FISHERIES INVESTIGATIONS

TAGGED skipjack continue to be received in the laboratory, the rate ranging from 20 to 50 per week. At the close of the month our aggregate returns were slightly in excess of 8 percent, or slightly over 600 tags. Particularly encouraging is the steady flow of tags released as early as May 1957. These latter are providing us with exceedingly valuable information on the growth of skipjack. At the present, rough examination of the data suggests a growth rate of about 1 pound per month considering fish that weighed about 5 pounds at the time of release.

The John R. Manning completed a re-survey of the skipjack concourse off Cape Kaea, Lanai. This concourse is a small area in which, for reasons as yet unknown, the ordinarily highly mobile skipjack schools appear to linger for considerable periods of time. We believe that a study of the food, behavior of the fish, and other environmental factors can provide us with an explanation of the almost constant presence of skipjack in this one spot. We plan then to apply this knowledge to the broader task of explaining the seasonal movements of this valuable species in the open ocean.

During the cruise just completed, skipjack and little tunny were still present in the concourse, though we are now in waters generally regarded as the "off season" Hawaiian waters. However, there appeared to have been some changes in the skipjack population, for 11- to 17-pound fish were found in an area that previously had been predominantly occupied by 5-pound fish. Other supposed concourses were investigated by the Manning, but no skipjack were located though little tunny were attracted to the vessel on three out of four chumming attempts.

The Hugh M. Gilbert continues her survey of the tuna resources of French Oceania, with the cruise scheduled for completion a few days before Christmas. Her radio messages indicate that she is encountering off season conditions with respect to the abundance of skipjack and yellowfin, for very few schools have been sighted and even fewer successfully chummed to the vessel.

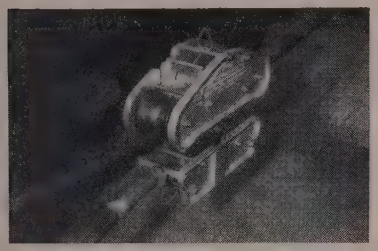
Laboratory analyses of collections of tuna larvae continue. One of our more recent goals has been to ascertain, by means of special tows, the best type of plankton haul for sampling the elusive tuna larvae. Our studies at present show that in the central Pacific a plankton tow to sample tuna larvae must go to at least 150 yards beneath the sea surface, for the larvae occur throughout those depths. Length of tow is still uncertain, for the samples must include enough larvae to permit estimation of abundance. It now appears that tows must be at least one-half hour in duration and very likely will have to be extended to a full hour.

An interesting sidelight to POFI's tuna larvæ studies in the central Pacific was brought out at a recent meeting of the Pacific Tuna Conference. In the far eastern Pacific, where, judging by commercial catches, skipjack are relatively abundant, skipjack larvae are practically non-existent according to scientists working in that area. Farther west in the central Pacific where the population of adult skipjack is not so impressive, at least superficially, we find larvae to be relatively abundant. One possible reason for this discrepancy is that we are simply underestimating the skipjack population in mid-ocean. This could come about because of the relative scarcity of oceanic birds to indicate the schools or because the schools in the central Pacific behave differently than in the eastern fringes of the ocean.

Two reports were issued during the month. The first, by Richard J. Callaway, draws together the miscellaneous oceanographic observations taken during the course of several albacore fishing cruises during 1956. The second publication summarizes the work on electrofishing carried out for POFI by the University of Hawaii. In this publication Professors Miyake and Steiger describe theoretical models of electric fields in sea water and discuss the problem of applying these models to practical situations. They further describe preliminary experiments with small fish confined to tanks and finally discuss their results with tuna.

They found that it was possible to produce strong electrotaxis in small yellowfin tuna, using a pulse frequency of 20 cycles per second and a current density of 4.0 ma./cm.2. They caluculated that in the open sea 23 times as much power would be required to obtain eqivalent response with electrodes 16 feet apart as was the case in the ponds. In summary, their work shows that tuna can be made to swim to a vessel by using electrotaxis. It is not possible to predict whether this can be made a practical reality; however, nothing has been learned that would discourage further research and development. ★

What's New or Different



Cable Meter For Trawlers and Draggers

A large capacity Trawl Cable Meter has been developed by the Olympic Instrument Laboratories of Vashon, Washington.

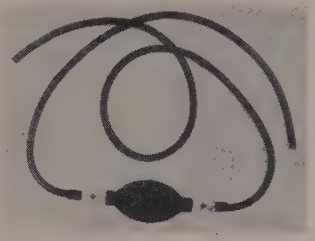
This new Model 750 will accommodate, without adjustments, ½-inch to 1-inch diameter cable with split splices and markers or unspliced cable to 1¾-inch. The 21 pound Meter is made of corrosion resistant aluminum and stainless steel. Measuring wheel has Neoprene rubber tire. Nylon bushings and sealed anti-friction bearings contribute to reliable service. The sealed counter, easily visible at 12 feet, indicates FATHOMS to 999 and subtracts when cable is hauled in. A single control lever permits rapid mounting or removal of Meter from cable. Electrically operated remote reading counters are available when required. Available through franchised distributors.

American Bosch Arma Purchases Hydramotive

The American Bosch Corporation has purchased Hydramotive Inc., of Cleveland, Ohio. The latter has developed a hydraulic starter known as the Hydrotor for all types of diesel and gasoline engines.

This fits well into the product line of the American Bosch Division, large producer of diesel fuel injection systems.

Hydraulic starters such as the Hydrotor have several advantages over conventional diesel starting systems. Cold weather starts are easier and surer, and in hazardous locations such as boats, use of the Hydrotor reduces the danger of explosion or fire to a minimum during starts. There are no electrical switches or motors or batteries, hence no danger from arcing between contact points or from battery fumes. Maintenance costs are reduced as expensive replacements of batteries and wiring is eliminated.



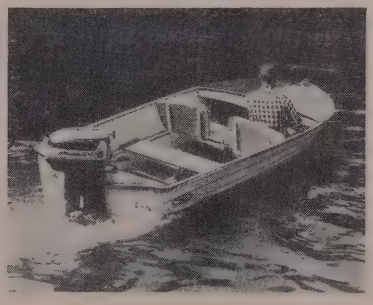
Self-Starting Siphon-Pump For Acids

A new hand-operated, self-starting siphon-pump designed for the safe handling of concentrated acids has been announced.

The siphon-pump has newly developed check valves of duPont "Alathon," a compound which is unaffected by concentrated hydrochloric, sulfuric and hydrofluoric acids (at room temperature) as well as alcohols, gasoline and most industrial solvents. Hand bulb and tubing are of neoprene, permitting speedy transfer of dangerous liquids with complete operator safety. General Scientific Equipment Company, 7516 Limekiln Pike, Philadelphia 50, Pennsylvania.

Retractable Nozzle for Boilers

A new device incorporated on Cleaver-Brooks line of boilers is a single tip retractable nozzle that simplifies cleaning of the burner nozzle. While the idea of a single tip nozzle is not completely new, Cleaver-Brooks' design is equipped with distinctive flexible lines which allow the nozzle to be inspected without removing any bolts. The single tip nozzle is said to offer more stable combustion and more positive mixing action of oil and air. Write Cleaver-Brooks Company, 326 East Keefe Ave., Milwaukee 12, Wisconsin.



Molded Fiberglass Boat

A new series of 12 ½-foot lapstrake boats has been added to the line of 15-foot "MFG" Boats for 1958.

Built on a newly designed hull of fiberglass reinforced plastic, the 12 ½-foot series includes three mahogany-trimmed models. The construction, according to the manufacturer, provides exceptional strength and stability. Write for information to Molded Fiber Glass Boat Company, 45 Fourth Avenue, Union City, Pennsylvania.

For DF Receivers

For boat owners with a space problem and heavy metal-work interference, a new loop extension kit permits the user to mount his DF receiver against the overhead and extend the loop through the cabin on a 14-inch support column. This puts the top of the loop a total of 32 inches from the bottom of the receiver cabinet.

The biggest features are in space saved, new freedom from structural interference, and standing eye level reading of the vertical compass rose on the receiver. Kaar Engineering Corporation, Middlefield Road, Palo Alto, California.

Uncle Sam's Answer Book

Uncle Sam's "Answer Book" has sold out so swiftly that a second printing has been ordered.

The 1956 edition of the *Statistical Abstract of the United States*, refered to popularly as "Uncle Sam's Answer Book," is compiled annually by the Bureau of the Census, a branch of the U. S. Department of Commerce.

Copies of the buckram bound volume may be purchased for $3.75 at the field offices of the U. S. Department of Commerce and from the Superintendent of Documents of the U. S. Government Printing Office.

The *Statistical Abstract* is a useful tool for the serious researcher into population changes, business trends, foreign trade, agricultural production, or any of the hundreds of subjects indexed, in its 34 chapters. For others it serves as a source of clinchers to end arguments as to the length of the principal American rivers, the highest mountain in the land, the coldest place, the windiest city, the number of Boy Scouts, and so on. Whatever the need, the Statistical Abstract's more than 1,000 pages of facts, graphs, and text supply the answers to a great many questions.

Here, for instance, are a dozen questions, and the answers from the 1956 Statistical Abstract:

1. *What is the average life expectancy of Americans?* At birth, the average expectation of life in years is about 67 years; for white males, 66.6 years; for white females, 72.7 years; for nonwhite males, 59.1 years; for nonwhite females, 63.7 years.

2. *Do "old soldiers" just fade away?* Through the Veterans Administration, Uncle Sam is still paying pensions to 188 veterans of the Indian Wars, to 60,125 of the Spanish-American War, and to a total of 2,668,786 of all wars.

3. *What are the average ages of men and women at first marriage?* The median age of grooms is about 23 years, for brides about 20 years.

4. *Which U. S. President vetoed the most bills?* President Franklin D. Roosevelt vetoed 631 bills, of which Congress passed 9 over his veto.

5. *How many commercial broadcasting stations on the air in the U. S.?* Commercial stations, licensed or holding construction permits on January 1, 1956, numbered 3,775, of which 3,333 were radio and 442 were TV stations.

6. *Whose "industrial muscles" are stronger—in coal, oil and steel—the U. S or U. S. S. R?* The United States outproduces the Soviets in coal by 9 percent, in oil by 400 percent, in steel by 94 percent.

7. *What is the population of the five largest countries?* China, 582 million; India, 377 million; Soviet Union, 214 million; United States, 170 million; Japan, 88 million.

8. *Are fires the principal enemy of American forests?* Insects and diseases kill more trees by far than any other cause.

9. *What is the area of the Continental United States?* 3,022,387 square miles, of which 2,974,720 square miles are land and 47,661 square miles are water.

10. *How many churches are there in the United States?* More than 300,000 churches with 97.5 million members.

11. *Speaking of altitudes, what are the highest and lowest points in the United States?* Mount Whitney with an altitude of 14,495 feet and Death Valley with a depth of 282 feet below sea level are the highest and lowest points, both in California.

12. *Where is the population center of the United States?* On basis of the 1950 Census, the U. S. center of population is 8 miles north-northwest of Olney, Richland County, Illinois.*

TUNA COSTS FAVOR CONSUMERS

The cost of living has hit a new high during the recent months, but at least one item is bucking the trend. The Tuna Research Foundation reports that canned tuna is actually 15% lower in price than four years ago.

Citing official government figures, the Foundation points out that in June, 1953, for example, the average price of tuna was 38½ cents. In June, 1957, it was 32 cents.

On the other hand, the U. S. Bureau of Labor Statistics reports that retail price index for all items in June, 1957 was 120.1, compared to 114.5 for the same month in 1953. The food price index last month was 116.2, or 2½ points above the June, 1953 figure.

With indications that living costs are headed even higher, Edwin L. Morris, director, Tuna Research Foundation, declared:

"The economy aspect is likely to assume even more importance as people try to stretch their food dollar. Furthermore, canned tuna is a nutritious protein food that can be prepared in a variety of main dishes as well as in sandwiches and salads."

Southern California canneries at Terminal Island and San Diego account for 85% of the U. S. tuna output, and supplies should be adequate to meet increased consumer popularity.

Exceptional Opportunity

For reliable person, man or lady, with vision and ability to act immediately for a lifetime of assured income. To service route of cigarette machines established locally for operator. $900 to $1800 cash investment required. THE RETURN OF WHICH IS GUARANTEED IN WRITING BY US, for you to earn up to $260 per month part time. You can net up to $28,000 annually on a full time basis. We are an established reputable concern with the finest and oldest name brand equipment. If you have the cash and are sincerely interested please write giving your phone number and brief background for a local interview at your convenience.

L & M DISTRIBUTORS, INC.
6513 Cedar Ave. So.
Minneapolis 23, Minnesota

Salmon Fishways

While fishways are able to pass mature salmon around power dams with varying degrees of efficiency, the problem of passing their progeny over the dams on their seaward migration has not been solved. Each dam extracts a toll from the migrants in its turbines and spillways.

One of a number of fishway investigations underway in this field is being conducted by the Washington Department of Fisheries under a U.S. Army Corps of Engineers contract at Big Cliff dam, located on the north fork of the Santiam River in Oregon, southeast of Salem.

The 1957 investigations will use about 180,000 young salmon, including 80,000 spring chinook yearlings and 100,000 fall chinook fingerlings. The salmon are being marked by tattooing in different colors at the Marion Forks salmon hatchery of the Oregon Fish Commission, about 40 miles upstream from the dam. Separate groups have been released in the spillways and turbines and their survival compared with that of others liberated below the dam. The tattooed fish are recovered in a series of eight pontoon fishing nets anchored four to six miles downstream.

Book Review

Sun Over Costa Rica

By Jaromir Sladek

This book, published last month, is an important novel of the poverty-stricken people of this Central American country.

The author is now a native of Costa Rica, having gone there four years ago from Duluth, Minnesota. Mr. Sladek speaks Spanish fluently, has travelled widely throughout the area and is completely familiar with the customs, rituals and modes of living of the people.

This is not a travelogue, but a sympathetic portrayal of real persons, fictionalized, and written with feeling and compassion and concern for the peasant's sad lot. Based on actual happenings, it points out their struggles to attain a satisfactory life.

Mr. Sladek also lived for a number of years in Pharr, Texas. He is now manager of the Pesquera Booth de Costa Rica, a subsidiary of Booth Fisheries of Chicago, Ill. The book published by Pageant Press, Inc., 101 Fifth Ave., New York 3, N. Y., sells for $4.00.

Problem of Discoloration In Canned Tuna

The development of off-colors in tuna meat during precooking is a tuna-cannery problem. Although these off-colors vary from green to shades of tan and brown, the popular term to describe this condition is "green tuna."

The U.S. Fish and Wildlife Service has been working on this problem to identify the chemical compounds that produce the desirable pink pigment that is characteristic of good-quality precooked tuna and then the off-color pigments of green tuna.

Studies of the properties of the pigment causing the desirable pink color of precooked and canned tuna show that the pigment is hemochrome, and the pink pigment can be stabilized by the proper addition of hemochrome-forming compounds and reducing agents.

The second phase of the investigation into the cause of discoloration or "greening" of tuna has been completed, and the results including recommendations for preventing the development of off-colors are being prepared for publication and will be released soon.

Publications

Specializing in
trade journals and
house organs
in quantities of
25m and less.

JOHN T. McINNIS PRINTING & PUBLISHING
127 S. OLIVE ST., ORANGE, CALIF. • KE 8-3923

Subscribe Here . . .

12 ISSUES **$3**
TWO YEARS FOR $5

MAIL THIS NOW . . .

PAN AMERICAN FISHERMAN
Orange, California

Please start my subscription with the next issue

..... 1 year $3
..... 2 years $5

In the United States and possessions.

Canada $4 per year; all other countries $5 per year.

Name_____

Firm_____

Street_____

City_____ Zone_____

State_____

DIRECTORY
Marine Sales and Services

These Firms Specialize in Serving the Fishing and Waterfront Industries. They Understand Your Problems — Save Time and Money by Calling Them

CANVAS

"Canvas Sea Anchors"

AMERICAN AWNING & TENT COMPANY
1105 INDIA STREET, SAN DIEGO 1, CALIF.

"Everything in Canvas"

J. E. MEYER — BElmont 9-0550

SERVICES

NAVAL ARCHITECTURE — REINFORCED PLASTICS

L. K. HOMYER

503 32nd St.
Newport Harbor
California

Telephone
ORiole
3-7353

SUPPLIES

Headquarters for . . .

MARINE and INDUSTRIAL SUPPLIES

OIL BURNING RANGES

The Carlson Co.
Phone BElmont 3-5444
1760 Kettner • San Diego 1

BROKERS

SERVICE FOR TUNA CLIPPERS
COMPLETE CUSTOMS CLEARANCE

Shreve & Hays
CUSTOM HOUSE BROKERS
Room 1 — B St. Pier
SAN DIEGO CALIFORNIA
Phone BE. 9-8019

FUEL INJECTOR SERVICE

Sales & Service
AMERICAN BOSCH
BENDIX SCINTILLA
ADECO FUEL PRODUCTS
TROJAN BATTERIES
SEACORD'S
1337 India St. San Diego 1
BElmont 4-1454

ELECTRICAL

CALIFORNIA ELECTRIC WORKS
Complete Electric Service
24 hours a day for 37 years
BElmont 2-2145
424 8th Ave. San Diego, Calif.

INSURANCE

- LIFE
- ANNUITIES
- RETIREMENT
- MARINE INSURANCE

"Low Guaranteed Cost"

M. E. SIMAS CO.
622 Rosecrans St.
San Diego 6, California
AC 2-3188

SALT

That Salty Salt

WESTERN SALT CO.

Plant
South End of
San Diego Bay

Office
1245 National Ave.

Telephone BElmont 3-8107
SAN DIEGO, CALIFORNIA

PAINTS

W. P. FULLER & CO.
MARINE PAINTS and GLASS
512 Front — BElmont 2-2033
803 7th — BElmont 9-4373
San Diego, California

PHOTOGRAPHY

Largest and Best Equipped Studio in San Diego

BUSCO-NESTOR
PHOTOGRAPHY
COMMERCIAL • INDUSTRIAL
MARINE
SALVAGE OPERATIONS
BElmont 9-4743
2670 5th Ave. • San Diego, Calif.

☆

Easy Way to Subscribe

On previous page is handy subscription blank; use it to make sure you don't miss an issue.

USE THE SUBSCRIPTION BLANK ON PREVIOUS PAGE

☆

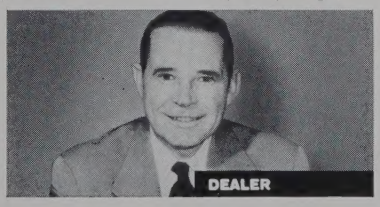
BEATRICE PINSLEY

She's always satisfied most with a brand that's made a name for itself!

"I MADE IT... and I make sure that the best materials and workmanship go into any product with *my* name on it. Naturally, people blame *me* if my product is unsatisfactory, and they stop buying it. I can't risk turning out anything that may be only 'second-best.' "

"I SOLD IT... recommended it because the name it has made for itself tells me it's one of the best, most up-to-date products in its field. In fact, a good brand name is the best *guarantee* my customers can have when they buy. And for me, too . . . I know they'll buy it again."

"I BOUGHT IT... because it's an advertised brand I can trust completely. I just won't risk my family's welfare on some product I don't know anything about—even when they say it's 'just as good.' I feel safer, somehow, when I stick to a brand I *know* I can depend on."



THE *BRANDS* YOU SEE ADVERTISED IN THIS MAGAZINE ARE *NAMES* YOU CAN TRUST!

They stand firmly behind every product and claim they make.

BRAND NAMES FOUNDATION, INC. • 437 FIFTH AVENUE, NEW YORK 16, N. Y.

Library, Pacific Oceanic Fishery Investigations
P. O. Box 3830
Honolulu, T. H.

gvt-1/

Now History . . .

NATIONAL TUNA WEEK
Oct. 31 to Nov. 9, 1957

The 1957 observance of National Tuna Week was beneficial to all segments of the California tuna industry.

Your Canners Association cut the pattern for a full, national publicity and promotional program embracing television, radio, magazines, and related products advertising.

Millions of consumers were made more aware of California tuna —its goodness, versatility, and place on the family menu.

With the resources of the industry backing up the campaign, this important annual food observance week helps move more product —and keep it moving.

We are always glad to help make the most of this opportunity.

CALIFORNIA FISH CANNERS ASSOCIATION INC.

Breast-O'-Chicken Tuna, Inc. · California Marine Curing & Packing Co.
Coast Fisheries (Division of the Quaker Oats Company)
Franco-Italian Packing Company, Inc.
Pan-Pacific Fisheries, Inc. · South Coast Fisheries, Inc.
Star-Kist Foods, Inc. · Sun Harbor Packing Company
Chicken-of-the-Sea, Inc.
West Coast Packing Corporation · Western Canners Company